

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. - 28. (Cancelled)
29. (Original) A method of detecting a target analyte, the method comprising the steps of:
 - a) providing a heterodiamondoid-containing probe;
 - b) binding the heterodiamondoid-containing probe to the target analyte, thus creating a biological label;
 - c) exciting the biological label with energy such that the biological label is caused to luminesce; and
 - d) detecting light emitted from the excited biological label.
30. (Previously Presented) The method of claim 29, wherein the energy is in the form of a beam of photons, such that the luminescence is photoluminescence.
31. (Previously Presented) The method of claim 29, wherein the energy is in the form of a beam of electrons, such that the luminescence is electroluminescence.
32. (Previously Presented) The method of claim 29, wherein the energy is in the form of heat, such that the luminescence is thermoluminescence.
33. (Previously Presented) The method of claim 29, wherein the energy is in the form of chemical energy, such that the luminescence is chemiluminescence.
34. (Previously Presented) The method of claim 29, wherein the energy results from the frictional contact between two surfaces, such that the luminescence is triboluminescence.
35. (Previously presented) The method of claim 29, wherein the heterodiamondoid-containing probe comprises at least one diamondoid comprising a diamondoid lattice having

multiple diamondoid lattice sites, each of the diamondoid lattice sites containing a carbon atom, and at least one vacancy or pore, and further wherein step a) includes replacing the carbon atom at one of the diamondoid lattice sites with a nitrogen heteroatom, wherein the replacement occurs at the diamondoid lattice site adjacent to the at least one vacancy or pore.

36. (Previously Presented) The method of claim 29, wherein the heterodiamondoid-containing probe comprises a diamondoid-containing material having a bandgap and further including the step of positioning impurity atoms within the diamondoid-containing material creating electronic states within the bandgap of the diamondoid-containing material.

37. (Previously Presented) The method of claim 29, further including the step of passing the biological label through a cell membrane after step b) of binding the heterodiamondoid-containing probe to the target analyte.

38. (Previously Presented) The method of claim 29, further including the step of passing the heterodiamondoid-containing probe through a cell membrane before step b) of binding the heterodiamondoid-containing probe to the target analyte.

39. (Original) The method of claim 29, wherein the detection of light emitted from the biological label is carried out using a photomultiplier tube.

40. (Original) The method of claim 29, wherein the detection of light emitted from the biological label is carried out using a charge-coupled device.

41. (New) The method of claim 29, wherein the heterodiamondoid-containing probe comprises at least one diamondoid comprising a diamondoid lattice having multiple diamondoid lattice sites, each of the diamondoid lattice sites containing a carbon atom, and at least one vacancy or pore, and further wherein step a) includes replacing at least one of the carbon atoms of the diamondoid lattice sites with a nitrogen heteroatom and inserting at least one nitrogen atom into a vacancy or pore within the diamondoid lattice.